

# Histological Findings in Portal Gastropathy and Its Association with Child-Pugh Score in Liver Cirrhosis

Aftab Abbasi,<sup>\*</sup> Musarat Kalhoro,<sup>\*\*</sup> Mehtab Abbasi<sup>\*\*\*</sup>

## ABSTRACT

**Objective:** To investigate histological findings of portal gastropathy (PG) and its association to Child Pugh score in liver cirrhosis.

**Methods:** Eighty five diagnosed cases of liver cirrhosis were selected for this cross sectional study, conducted in the department of Anatomy and Medicine/Isra University Hyderabad from June to December 2012. Sampling used was non-probability convenient and followed inclusion and exclusion criteria. Olympus XQ 140 (version 3) endoscope was used to obtain 2 mm thick tissue specimen by punch biopsy. Biopsy sample was washed with 0.9% NaCl followed by fixing into 10% formaldehyde. Portal Gastropathy (PG) was graded as none, mild, moderate, and severe on histopathology. SPSS 21.0 version was used for the statistical analysis (p-value of  $> 0.05$ ).

**Results:** Mild, moderate, severe and no gastropathy were observed in 52.9%, 34.1%, 4.7%, and 8.2% respectively. An increase in gastric glands was observed. Pyloric antrum showed lamina propria infiltrated with inflammatory cells in most of tissue samples. Similarly gastric mucosa thickness as mild, moderate and severe was noted in 11.8%, 8.2% and 6.4% of cases respectively. Capillary dilatation and edema of lamina propria was noted in 9.4% of cases, rest revealed no such observation. Portal gastropathy (PG) and Child Pugh Class (CPC) association showed a positive correlation of  $r=0.674$  ( $p=0.011$ ).

**Conclusion:** Stomach revealed changes in gastric mucosa and its thickness, gland size and number and presence of inflammatory infiltrate parallel to severity of Child Pugh score.

**Key Words:** Portal gastropathy, Child Pugh score, Liver cirrhosis

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## INTRODUCTION:

Gastric histology reveals 4 distinct layers from outer to inner side as serosa, muscularis mucosae, submucosa, and mucosa. Mucosa comprises of epithelial lining laying on lamina propria, and smooth muscle layer called the muscularis mucosae. Later one creates movement of mucosa for digestion and absorption to occur

properly. Mucosa is thrown into folds called rugae. Mucosa shows gastric glands which extend deep to muscularis mucosae. Gastric glands open into mucosa surface onto the "gastric pits". The gastric mucosa shows tubular glands which vary according to zones. In cardiovascular district of stomach, the lamina propria contain straight forward or expanded tubular bodily fluid emitting organs, the mucosa of funds and body frame the major histological zone which contain organs that discharge corrosive, pepsin, gastric liquid and in addition some cautious bodily fluid.<sup>1</sup> Mucosa becomes abnormal in patients who develop portal hypertension causing portal gastropathy.<sup>2,3</sup> PG shows grossly visible abnormal changes in the stomach mucosa. Submucosal vascular ectasia is a prominent finding with widening of folds. Thus

\* Assistant Professor, Deptt. of Anatomy, Isra University Hyderabad.  
 \*\* Assistant Professor, Deptt. of Gastroenterology, Isra University Hyderabad.  
 \*\*\* Assistant Professor, Deptt. of Cardiology, Isra University Hyderabad.

### Correspondence to:

**Dr. Aftab Abbasi**

Assistant Professor  
 Department of Anatomy  
 Isra University, Hyderabad. Sind. Pakistan.  
 Email: aftababbasi50@yahoo.com



PG produces histological changes of stomach mucosa which vary according to severity of Portal hypertension.<sup>4,5</sup> Mucosa shows 3 important findings called the mosaic design, cherry-red spots and dark "chestnut" spots.<sup>4</sup>

The PG may result in blood loss which remains unnoticed when in small quantities, but endangers life if severe enough resulting in hypovolemia. Currently, the liver cirrhosis is very common in Pakistan, but the PG is highly overlooked because of lack of studies.<sup>6,7</sup> The studies on the issue lag behind the magnitude of the liver cirrhosis.

At present a few studies are available published in medical literature, hence the topic remains a neglected area of research. Little attention has been paid on the problem in the Pakistan where liver cirrhosis is prevailing these days. The present study was led to decide the histological changes in gastric mucosa and connection to Child Pugh Score in liver cirrhosis patients.

#### **METHODS:**

The present cross sectional study took place at the Hepatology unit, Department of Medicine and Department of Anatomy, Isra University, Hyderabad. The study covered duration of June 2012 to December 2012. Eighty five diagnosed cases of liver cirrhosis were selected for study. Sampling used was non-probability convenient and followed inclusion and exclusion criteria. Diagnosed cases of liver cirrhosis of age >18 years and <65 years of both sex undergoing upper GI endoscopy were included. Different age, patients taking NSAIDs, and unwilling patients were excluded. Volunteers were informed about the purpose, losses and benefits of study. Signing of written consent form was mandatory for the study protocol. Institutional ethical review was taken in writing. Confidentiality of patient data was maintained. A Proforma was designed for data entry.

**Endoscopy and biopsy:** Olympus XQ 140 (version 3) endoscope was used to obtain 2mm

thick tissue specimen by punch biopsy. Biopsy sample was washed with 0.9% NaCl followed by fixing into 10% formaldehyde.

**Gastropathy Grading and Child Pugh score (CPC):** Portal Gastropathy (PG) was graded as none, mild, moderate, and severe on histopathology. CPC was graded according to standard criteria.<sup>2</sup>

#### **Tissue sections, staining and slide preparation:**

Ascending grade of alcohol followed by xylene were used for the dehydration purpose. Soft paraffin was used for the tissue impregnation at 68°C for one hour. Rotator microtome was used to cut 4 µ thick tissue sections. Dewaxing was done in hot plate followed by cleaning in 2 changes of xylene. Absolute alcohol was used for removal of xylene. Hydration was performed before staining. H & E staining was used. Microscopic slides were mounted in the Canada balsa. Light microscopy was used for histological examination at different magnification power.

**Data Analysis:** SPSS 21.0 version was used for the statistical analysis (p-value of  $\leq 0.05$ ). Continuous and categorical variables analysis was done by the Student's t-test and  $\chi^2$ -test respectively. Association of Portal gastropathy and CPC score was analyzed using Spearman's correlation method.

#### **RESULTS:**

Mean  $\pm$ SD age was noted as 47 $\pm$ 11.5 years. Of 85, 56 (65.8%) were male and 29 (34.1%) female. Mild, moderate, severe and no gastropathy were observed in 52.9%, 34.1%, 4.7%, and 8.2% respectively. An increase in gastric glands was observed. Mild, moderate and severe increase in number of gastric glands was noted in 38.82%, 21.18% and 3.53% respectively as shown in figure 2. In 57.65% of cases the size of gastric glands was normal while rest revealed different grades of gland enlargement. Enlargement of gastric glands, graded as mild, moderate and severe, was observed in 23.54%, 9.41% and 9.41% of cases respectively. Pyloric antrum showed lamina propria infiltrated with inflammatory cells in most



of tissue samples.

Similarly gastric mucosa thickness as mild, moderate and severe was noted in 11.8%, 8.2% and 6.4% of cases respectively. Capillary dilatation and edema of lamina propria was noted in 9.4% of cases, rest revealed no such observation. Portal gastropathy (PG) and Child Pugh Class (CPC) association showed a positive correlation of  $r=0.674$  ( $p=0.011$ ). Most common cells were, found 95.2%, lymphocytes in the lamina propria of the body of stomach. Similarly gastric mucosa thickness as mild, moderate and severe was noted in 11.8%, 8.2% and 6.4% of cases respectively. Capillary dilatation and edema of lamina propria was noted in 9.4% of cases, rest revealed no such observation. Portal gastropathy (PG) and Child Pugh Class (CPC) association showed a positive correlation with significant p-value ( $r=0.674$ ,  $p=0.011$ ) as shown in table & graph I.



Figure. 1: Histology Shows Congestion of Mucosa H&E x 100

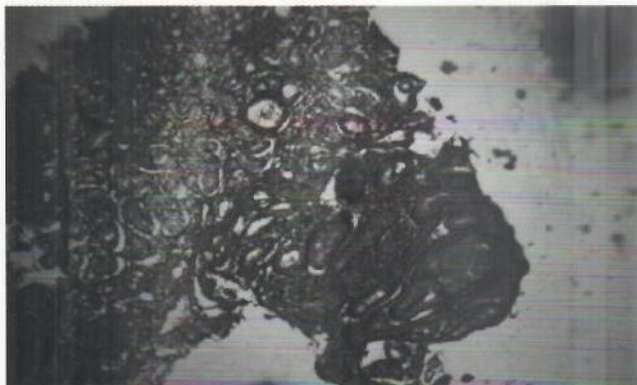


Figure. 2: Histology Shows an increase in Size of Gastric Glands H&E x 100

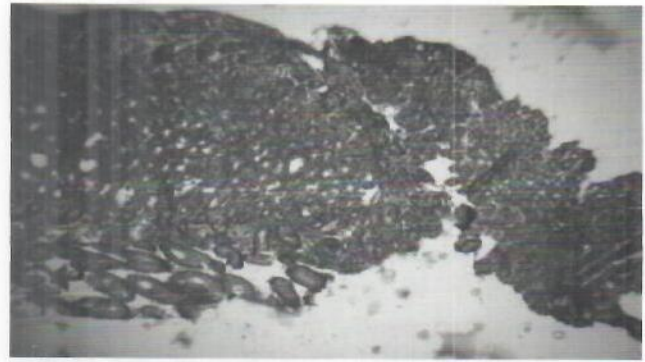
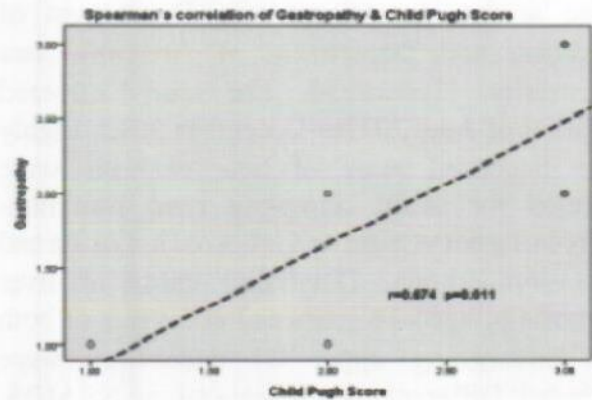


Figure. 3: Histology Shows Inflammatory Infiltration of Gastric Mucosa H&E x 100



Figure 4: Histology Shows Inflammatory Infiltration of Gastric Mucosa H&E x 100



Graph 1: Spearman's rho Correlations of Gastropathy & Child Pugh Score (CPC)

Table-1: Spearman's rho Correlations of Gastropathy & Child Pugh Score (CPC)

	r-value	p-value*
Gastropathy & CPC	0.674	0.011

\*Correlation is significant at the 0.05 level (2-tailed)



**DISCUSSION:**

Liver cirrhosis is major health problem of country. People belonging to any social class, ethnicity and age are suffering. Alcohol induced liver cirrhosis is most common cause in developed countries while viral hepatitis accounts most in developing countries.<sup>8</sup> It is a most imperative reason for passings and dismalness everywhere throughout the worlds.<sup>9</sup> It is likewise a typical reason for mortality amongst Pakistani population<sup>10</sup> and incessant reason for confirmation in our clinics.<sup>11</sup> Portal hypertensive gastropathy (PG) is characterized by mucosal and sub mucosal vascular ectasia without Inflammation. A considerable measure of reasons including change in the blood flow to spleen, humoral factors and abnormal vascular integrity has been suggested in the pathophysiology of the PG.<sup>12</sup> The lesions of PG are one of the very common complications of the Portal hypertension. The PG prevalence range is reported as 4% - 98% in the adult population.<sup>13-15</sup> In present study, PG was observed in 97.7% of cases, the findings are comparable to above studies. The present study reports a positive correlation between PG and CPC; the findings are of clinical importance. A multicenter study included 2720 adults, who were assessed by endoscopy. They reported frequency of PG as in 63.3% in children with cirrhosis and 16.9% in those without cirrhosis.<sup>16</sup> Another previous study reported frequency of PG as 61 and 54% patients without and with cirrhosis. In 20% portal vein thrombosis and blockage was noted.<sup>17</sup> In another study a link of PG with the PH was reported among 18 children with intrahepatic PH and 6 children with extra hepatic PH.<sup>18</sup>

A previous study<sup>3</sup> evaluated 51 children with PH of liver cirrhosis and reported high frequency of PG. The findings of above studies are in keeping with the present study. Several of previous studies had reported positive results on the development of PG associated with the severity of liver disease,<sup>19, 20,23</sup> whereas the others have not shown any relationship.<sup>21,22</sup> The finding of connection of PG and CPC are equivalent to present study, as we found a positive relationship in the middle of's PG and CPC, the discoveries are

of clinical significance. Scoring of portal gastropathy correlated with the severity of CPC score in the patients of the present study. Our findings are in agreement with previous studies.<sup>24,25</sup>

In present study, we found a positive correlation of PG with CPC class. Portal gastropathy (PG) and Child Pugh Class (CPC) association showed a positive correlation with significant p-value ( $r=0.674$ ,  $p=0.011$ ) as shown in table & graph I, similar to previous adult studies.<sup>17, 20</sup> Previous studies had reported positive correlation of PG with the mucosal changes in liver cirrhosis.<sup>22,26-28</sup> The above findings are parallel to present study. The findings of mucosal edema, dilatation of capillaries and venules in the biopsy specimens were noticeable findings which are supported by previous studies.<sup>3,29,30</sup>

**CONCLUSION:**

Stomach revealed changes in gastric mucosa and its thickness, gland size and number and presence of inflammatory infiltrate was observed in liver cirrhosis patients with portal gastropathy in parallel to severity of Child Pugh score. Child Pugh score may be predictive of portal gastropathy, however, further studies are recommended.

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